

**Abstract**

A communications network for a metropolitan area is disclosed. The network is comprised of three basic types of nodes: an access multiplexer, a photonic switch, and a core node. The access multiplexer provides multiplexing of data packets from end-users onto at least one sparse wavelength division multiplexed (SWDM) wavelength. The SWDM wavelengths are carried over fiber cable to the photonic switches, which consolidate these wavelengths into dense wavelength division multiplexed (DWDM) wavelengths for transmission to the core node. The core nodes include a photonic switch (PSX) and a service-aware terabit router core for routing packets within the metropolitan area via the network or out to a long haul network. The photonic switches and core nodes are capable of switching at the wavelength, group of wavelength, and fiber levels.